

tures built on the fruits of that research was supported by industry and the Bush Administration, but it wasn't passed until shortly after Clinton took office. "We did the work," says William Morin, director of technology policy for the National Association of Manufacturing. "But they brought it to closure, so let them take credit."

■ **Greater patent protection.** Inventors working for small and large companies will benefit from the General Agreement on Tariffs and Trade (GATT) and the North American Free Trade Agreement, which set international standards for patent protection, say patent lawyers and industry representatives. Although negotiations on both agreements were well under way when Clinton took office, his Administration strengthened provisions relating to intellectual property rights. "They have been very aggressive on this front," says Glueck. But some lawmakers argue that GATT provisions will hurt independent inventors, and some House Republicans want to repeal the measures.

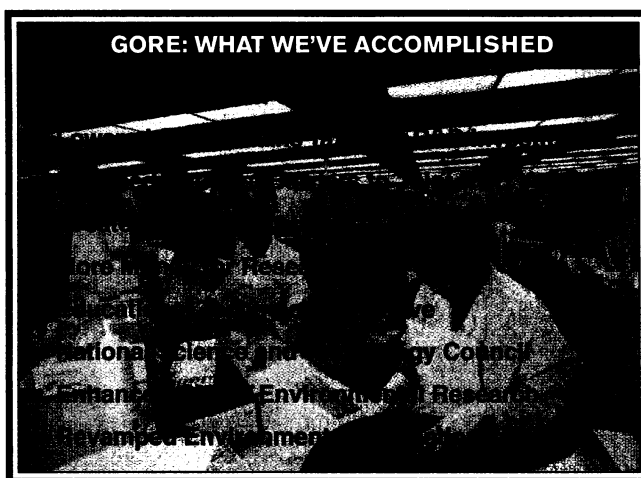
■ **More money for research.** This is an area of long-standing bipartisan agreement. The budgets of the National Institutes of Health (NIH) and the National Science Foundation (NSF) have grown since 1993, a continuation of a trend from the Bush and Reagan Administrations, although NSF's growth curve has flattened. There is little disagreement between Republicans and Democrats on the need to protect these two organizations—particularly NIH—from major reductions. "Health research has been a priority for us and for Congress," Gore acknowledged.

■ **Educational technology initiative.** Clinton and Gore last week proposed spending \$2 billion over 5 years to give all teachers and students access to the Internet. Individual states must come up with specific strategies, with money from the Department of Education. The proposal is an expanded version of an initiative proposed last year that has met with skepticism from the Republican Congress.

■ **The National Science and Technology Council.** This new interagency group, chaired by Clinton, is intended to put R&D issues on a par with national security and economic matters. White House officials say it has proved helpful in coordinating a host of science and technology issues, from an interagency lab review to a survey of national security technology. But critics say its many subcommittees produce little but paper, adding that the council offers little real

direction and lacks the clout to limit turf battles among agencies.

■ **Enhanced global environmental research.** Gore is a longtime supporter of environmental research and in particular climate change studies. Most of the programs and budgets that fund such research were put in place while Bush was president and backed by then-Senator Gore, but they have been under fire in the Republican Congress. Although a House Democratic staffer says Gore has shown "an absence of leadership" in protecting the program in this new environment, scientists in the field give the Administration high marks. "I think they've proven their support," says Edward Frieman, a physicist at the Scripps Institution of Oceanography. In particular, he gives the Administration high marks for defending the Earth Observing System, a program to orbit environmental satellites.



■ **Revamped environmental regulations.** The Administration has revamped the way industry meets standards set by the Environmental Protection Agency (EPA) by giving companies more flexibility in choosing what method they want to use to reduce pollution. EPA is also pushing for international environmental management standards through the Geneva-based International Organization for Standardization. These moves do not require congressional approval and have widespread industry support.

Although Gore's list is heavy on helping high-tech industry, say policy analysts, his minimal mention of basic research may actually be a blessing for academia. "By elevating technology, they made it a lightning rod [for attacks by Republicans]," says Morin. Or as one Democratic staffer puts it, "Every program Clinton and Gore like, the Republicans dislike."

—Andrew Lawler

Next week: Health and Human Services Secretary Donna Shalala discusses the Administration's record on biomedicine in an exclusive interview with *Science*.

ACADEMIC POLITICS

MIT Torn by Bitter Dispute Over Missile

The Patriot batteries that chased Iraqi Scuds across the desert during the Gulf War have been silent for 5 years now, but there has been no peace for scientists engaged in skirmishes over this anti-missile weapon. The continuing academic battle has focused on the U.S. Army's claim that the Patriots shot down most of the Scuds they targeted. That claim was challenged most directly by Massachusetts Institute of Technology (MIT) physicist Theodore Postol, an authority on ballistic missile defense. In 1992 and 1993 he co-authored analyses suggesting Patriot was a near-total failure in knocking out Scuds.

Postol's work provoked a counterstrike from Patriot's manufacturer, Raytheon Corp. of Lexington, Massachusetts, followed by a series of bitter accusations and investigations within the MIT community that continue to reverberate around campus. Early in the dispute, Raytheon issued a videotape suggesting that Postol had doctored evidence in his study of Patriot's performance. Postol's security clearance was also challenged at one point on the grounds that he may have violated classification rules; after successfully reversing those charges, he began a campaign to clear his name.

In 1994, Postol accused Shaoul Ezekiel, director of MIT's Center for Advanced Engineering Studies, of allowing Raytheon to claim falsely that Ezekiel was critical of Postol's Patriot analysis. And when Ezekiel would not publicly disavow Raytheon's comments, Postol demanded a formal misconduct inquiry. The dispute has dragged on at MIT for 2 years, but this month a faculty investigation produced a final report exonerating Ezekiel of misconduct, while praising Postol's "service to the nation in documenting the ineffectiveness of the Patriot in the Gulf War."

Postol, however, is not letting the matter rest there. He contends that the affair still raises delicate questions about a professor's responsibilities while consulting for industry and about the process by which MIT investigates misconduct charges. Postol also says that these issues are all the more important because any misrepresentations could lead to an inaccurate assessment of a weapons system designed to protect lives on the battlefield.

Going ballistic. The clash between Postol and the Patriot's champions erupted

in a 7 April 1992 subcommittee hearing of the House Committee on Government Operations. Postol—a professor at MIT's Defense and Arms Control Studies Program and a former analyst with the Office of the Chief of Naval Operations—described to Congress how he had made detailed studies of newsreel images of Patriot-Scud encounters. Raytheon officials did not testify, but a witness critical of Postol's work played a Raytheon tape narrated by Ezekiel, with the sound turned off because the committee chair ruled that Ezekiel had not been sworn in. Although Ezekiel never directly referenced Postol's work in the tape, he explained that commercial video recorders cannot capture high-speed events because of their relatively slow frame speed. Another witness presented this argument at the hearing as the tape played silently.

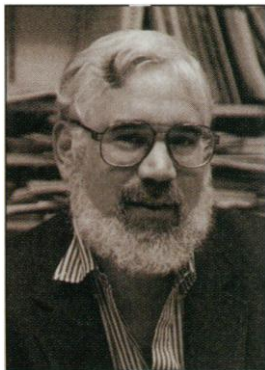
Postol didn't take action, however, until he read a 4 February 1994 letter to the editor of the *Boston Globe* by Raytheon's vice president for corporate communications, Elizabeth Heller Allen. She wrote that "self-appointed experts," an implicit reference to Postol and his MIT colleague George Lewis, "rely heavily on TV video footage (an approach repudiated by Professor Shaoul Ezekiel of MIT) to try to prove that Patriot did not work—the MTV school of weapons analysis." What angered Postol was that Ezekiel concedes he never examined Postol's Patriot analysis, but addressed the issues hypothetically. Postol claims his conclusion about Patriot's failures took the slow frame speed into account. Postol demanded that Ezekiel publicly disavow Raytheon's letter.

When Ezekiel responded that he had simply produced a report "to show that commercial television is not very reliable for studying high-speed events," Postol wrote back to him that "it is clear that Raytheon is misrepresenting your work in order to claim my analysis is fraudulent, and you are knowingly allowing this to happen." Postol regards Ezekiel's failure to correct the *Globe* letter as "unethical conduct."

Ezekiel views Postol's attack essentially as an annoyance, saying he doesn't understand Postol's concerns. After all, Ezekiel notes, he isn't being charged with misconduct for what he has done, rather for what he hasn't done—failing to correct someone else's error. While he agrees that his video may not have been a relevant criticism of Postol's Patriot work, he says he never claimed that it was. Ezekiel declined to discuss in detail his reasons for making the

tape, saying the controversy didn't involve him: "Let [Postol] take it up with Raytheon," Ezekiel says. "I really have no axes to grind."

Rebuffed by Ezekiel, in February 1994, Postol wrote MIT's president, Charles Vest, to request a meeting to discuss Ezekiel's behavior. Although university rules say that allegations of misconduct should be pursued "promptly," a year went by before Vest appointed David Litster, MIT vice president



Patriot critic. MIT professor Ted Postol.

and dean of research, to conduct an inquiry. Vest concedes his response to Postol was sluggish, blaming the delay on "administrative overload." According to Postol, Litster asked for materials in the spring of 1995, but did not interview him in depth. On 8 August, Postol wrote to Vest to learn what had happened, and Vest replied on 6 September by forwarding Litster's two-page review, dated 30 August.

Litster concluded that Raytheon's letter to the *Globe* was an "exaggeration" and that the company was "disingenuous in its defense of the Patriot," but that Ezekiel "has done nothing that could be characterized as unethical." Litster offered little insight into how he reached this conclusion. (MIT policies say a report of this kind "should contain sufficient documentation to permit a later assessment" of its rationale.)

Postol, unsatisfied with Litster's handling of the case, complained again to Vest, who responded curtly in a 1 November 1995 letter: "I now consider that the matter is closed, and that neither you nor the Institute would be well served by continuing to discuss it."

This was not to be MIT's last word, however. The chair of the faculty, Lawrence Bacow, a professor of law and environmental policy, decided last fall at Postol's insistence that the faculty should conduct an investigation of its own. Bacow issued a report on 1 February concluding that Ezekiel's conduct "clearly meets the high ethical standards of a faculty member engaged in scholarly debate." Although Bacow's report found that Raytheon had published "an exaggeration" in its letter to the *Globe*, it excused Ezekiel on grounds that a scholar does not have to correct an-

other person's claims about his work, as such an obligation would be "burdensome and unworkable."

In addition to praising Postol's service to the nation, the faculty report noted that he had "prevailed in this debate." It concluded on an upbeat note: "The truth emerged as it should, and here the matter should rest."

Here it may not rest, however, for the parties are still aggrieved.

Trouble in the family. Although absolved of wrongdoing, Ezekiel is "furious" that Postol accused him of misconduct without hearing the Raytheon video. (The audio channel of the tape has never been played in public, and neither Raytheon nor Ezekiel would share it with Postol.) Ezekiel also notes that Postol mistakenly claimed that Ezekiel had used MIT facilities to make the tape. (He used facilities arranged for by Raytheon.)

Postol, for his part, is "madder than hell" that the Bacow report harshly criticized him for claiming that Ezekiel had a "business contract" and an "ethically questionable liaison" with Raytheon. The faculty report says: "Ezekiel denies having ever had any consulting, contract, or business relationship with Raytheon." In an interview with *Science*, Ezekiel insisted that he has had no business dealings with Raytheon, although he qualified his statement with regard to the Patriot tape. He said that he had had an implicit understanding with Raytheon that he would be paid standard consulting rates for making the video, although when he agreed to work for Raytheon, "they didn't even bring up the rate." He has received no money to date because "I haven't even sent them a bill."

Postol feels that Ezekiel's relationship with Raytheon is critical. He argues that the *Globe* letter was not written by an independent third party, but one of Ezekiel's collaborators, and that this obligated Ezekiel to ensure that his work was not misrepresented.

Postol has also turned his fire on MIT, suggesting in an interview with *Science* that Raytheon's economic and personal

ties to MIT may have made the school reluctant to tangle with the company. Raytheon has in the past provided a modest amount of research funding for MIT faculty. And Postol notes that, during the controversy over the Patriot missile, Vest appointed Raytheon's chief executive officer, Dennis Picard, to the scientific advi-



Collateral damage? Apparent Patriot misfire, Haifa, 1991.

sory board of the school's Lincoln Laboratories. In addition, MIT has long enjoyed Raytheon's participation in the university's "industrial liaison" program. Members pay a fee averaging \$40,000 to take part in joint research efforts and receive prepublication copies of journal articles by faculty. "Companies want a quid pro quo," says William Culbert, the school's liaison with Raytheon. "They want to get something for their dollars."

Culbert says MIT recently even offered to change the name of Postol's workplace to the Raytheon Building. The name change, he explains, was contingent on Raytheon donating money to rehabilitate the build-

ing. Raytheon declined, and MIT picked up the \$1.5 million tab. Yet Culbert, echoing statements by Vest and other administrators, says that, while Postol's work was a "burr in the saddle," Raytheon officials never asked MIT to muzzle him.

Vest says Raytheon's corporate ties to MIT played no part in the controversy, and that Picard "never once—nor did any Raytheon employee—mention this issue to me." Vest regards it as "primarily a dispute between two faculty members," adding that "I think that what Ted Postol did was extremely important." And Bacow says MIT's ties to Raytheon were irrelevant, and that he stands by the facts in his report. "The

time has come for everybody to get on with their own work," he says.

But those who know Postol well, like his MIT program chief, Harvey Sapolsky—who thinks the technical facts are on Postol's side—don't expect the matter to die soon. Sapolsky says: "Ted's not going to say this ends any time." Pondering what would satisfy Postol, he adds: "I don't know. Maybe a meeting of Saddam [Hussein] and George Bush and Dennis Picard" followed by a letter "saying they're all sorry."

—Jock Friedly

Jock Friedly is a free-lance writer in Arlington, Virginia.

RUSSIA

Funding Crisis Provokes Street Protests

MOSCOW—Researchers took to the streets here last week to draw attention to a funding crisis that has halted most research at institutes of the Russian Academy of Sciences (RAS) in the past 2 months. On Wednesday, 14 February, about 1500 demonstrators gathered at the gates of Moscow's Gorky Park and, harking back to Soviet days, waved red flags and listened to speakers blame President Boris Yeltsin and former Prime Minister Yegor Gaidar for "ruining glorious Russian science."



Out in the cold. Researchers from the Russian Academy of Sciences protest nonpayment of promised government funds.

The demonstration was the first of a promised wave of protests announced 2 days earlier by the Trade Union of RAS Employees, which is dominated by Gennady Zyuganov's Communist Party of the Russian Federation. Physicist Viktor Kalinushkin, chair of the coordinating committee of RAS research collectives, said at a press conference that the union launched the campaign to protest the worst financial crisis for Russian science since the breakup of the Soviet Union. Last December, he said, RAS institutes received no funding whatsoever, while in January they were allotted just \$6.7 million, half the amount they received 2 months earlier in November 1995.

This crisis comes on top of chronic under-

payment last year. The government had told RAS it would get an increase of 80% in 1995 over the previous year, but Kalinushkin said the finance ministry had transferred only 72% of the funding promised for the whole year. To make matters worse, prices had tripled during the same period, and the cost of electricity and heating had increased four times. As a result, the accumulated debts of RAS institutes for the past year for electricity and heating now equal 2 to 3 months' worth of funding. Since December, with no salary payments in sight, many RAS employees have left on open-ended vacations. Only those institutes with other sources of finance, such as industrial contracts or overseas grants, have been able to pay minimal salaries and continue research.

The union announced its intention to take action on 5 February when Valery Sobolev, the trade union's chair, sent a telegram to the head of the science department at the finance ministry demanding payment of the \$21 million in outstanding 1995 funding for RAS's European division, which includes the powerhouses of Moscow and St. Petersburg, and another \$31 million from this year's budget to pay salaries and make advance payments for electricity and heating. In addition, the union demanded that the ministry increase RAS's funding for the first 3 months of 1996 from \$68.7 million to \$105 million and to amend the 1996 budget to raise the whole of science funding from \$2.4 billion up to \$4.2 billion. If the government does not react by 14 February, Sobolev warned, the trade union would start a campaign that may include picketing government buildings, blocking main highways,

strikes, and even hunger strikes.

The government was already in crisis talks with the RAS presidium and agreed to allot \$55 million to all four of the RAS's regional divisions. The finance ministry transferred \$10.5 million a few days after the union sent its telegram, and the government promised the rest between 19 and 25 February. But the trade union was not impressed, and the protests began on 14 February as planned.

Neither the science ministry nor the RAS presidium has expressed any official reaction to the union's campaign. Science Minister Boris Saltykov told *Science* he understood and agreed with the protesters, but he pointed out that some areas of science outside RAS are in even worse shape. The ministry itself has not received any funding at all since January, and its competitive grant program, the Russian Foundation for Basic Research, state scientific centers, and other programs have all been left high and dry.

The Duma, the lower house of Russia's parliament, was due to debate the issue as *Science* went to press. Mikhail Glubokovsky, deputy chair of the new Duma Committee on Science and Education, says that while the government should take most of the blame for the current crisis because it spent billions of dollars demolishing and then rebuilding Chechnya, parliament should have demanded a larger budget for science last year in the light of Russia's rampant inflation.

Glubokovsky believes that certain political parties, which he did not name, are using the crisis and the very just demands of the protesters for their own political ends. He totally rejected the idea expressed by some protesters that the West wants to ruin Russian science. The Westerners understand, he says, that if this happens science would be losing an important part of itself and would be hobbling around like a man with a wooden leg.

—Andrey Allakhverdov

Andrey Allakhverdov is a writer in Moscow.